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Setup and Operation of the Third-Generation TeleEngineering Communications Equipment – Deployable (TCE-D) System, Version II

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ABSTRACT: In FY97, the U.S. Army Engineer Research and Development Center (ERDC) initiated a technology demonstration program to determine the feasibility of providing deployed troops with direct access to subject matter experts (SMEs). Direct access to SMEs allows responses to engineering challenges beyond the in-theater capability to be provided without the time delays and costs associated with deploying the SME to the theater. Shortly after being established, the TeleEngineering Operations Center (TEOC) initiated an effort to develop a secure, deployable communications package capable of video teleconferencing and data transfer. Described in this report are the components comprising the third generation of this package and steps necessary to set up and operate the system.

Contents

Preface

The work reported herein was funded under the TeleEngineering Operations Technology Demonstration Program at the U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, MS. Mr. Jeff Williamson and Dr. Larry Lynch, Geotechnical and Structures Laboratory (GSL), and Messrs. Jeff Powell and Bryan Register, Information Technology Laboratory (ITL), prepared this report.

The work at ERDC was performed under the general supervision of Dr. Albert J. Bush III, Chief, Engineering Systems and Materials Division, GSL; and Dr. David W. Pittman, Acting Director, GSL; Dr. Charles R. Welch, Chief, Engineering and Informatic Systems Division, ITL; and Dr. Jeffery P. Holland, Director, ITL.

COL James R. Rowan, EN, was Commander and Executive Director of ERDC. Dr. James R. Houston was Director.

1 Introduction

In FY97, the U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, MS, initiated a technology demonstration program to determine the feasibility of providing deployed troops with direct access to subject matter experts (SME). Direct access to the SME allows responses to engineering challenges beyond the in-theater capability to be provided without the time delays and costs associated with deploying the SME to the theater.

During the execution of the technology demonstration, the ERDC TeleEngineering Operations Center (TEOC) was established as the main operations center from which TeleEngineering support would be provided to the deployed force. Shortly after the establishment of the TEOC, the U.S. Army Engineer Division, North Atlantic (NAD), requested TeleEngineering support for operations in the Balkans region. In addition to engineer analysis support, the TEOC was requested to develop a method for deployed U.S. Army Corps of Engineers (USACE) personnel to communicate with the U.S. Army Engineer District, Europe (NAU), NAD, and the TEOC. The requirements for the communications equipment were (a) deployability and (b) the capability to allow secure and nonsecure data transfer, voice, and video teleconferencing (VTC). Additionally, the TEOC was requested to provide a fixed-site TeleEngineering Communications System to be used at NAU, NAD, and the TEOC, so that personnel at these locations could communicate with deployed personnel. The resulting fixed-site system is based on an Integrated Systems Digital Network (ISDN) and is described in a separate ERDC report; the deployable, satellite-based system is described herein.

The TEOC requested that the ERDC Information Technology Laboratory (ITL) take the lead in developing the communications system. Within a 3-week period, ITL and TEOC personnel researched, designed, procured, validated, and transferred the satellite-based system to NAU for communications with the ISDN-based fixed-site system. During FY 2001, a continuing effort to reduce the size of the system, increase the transportability, and reduce the setup time and effort of the deployable system produced the second-generation deployable system, and subsequently, the third-generation deployable system.

The purpose of this report is to describe the components of the third-generation TeleEngineering Communications Equipment-Deployable (TCE-D) System, Version II, that employs the Klashopper data communications card and to provide the step-by-step procedures required to set up and operate the system.

Chapter 2 describes the components that comprise the system. Chapter 3 provides details on setting up the equipment and the interconnections between the individual components. The operation of the system (i.e., making a voice call, conducting a VTC, and transferring data) is presented in Chapter 4; additional operational topics are covered in Chapter 5. Chapter 6 provides instructions for preparing the system for shipment; contact information for technical support is provided in Chapter 7. Appendices A and B provide a quick reference for operations discussed in Chapter 4. Basic troubleshooting tips are provided in Appendix C.

2 Components of the Third-Generation TeleEngineering Communications Equipment-Deployable (TCE-D)

Overview

The deployable system is contained in the three cases illustrated in Figure 1.

Figure 1. The three cases of the system

Cables necessary for connections between the main case, International Maritime Satellite (INMARSAT) M4 Terminal, laptop, and a power source are provided with the system.

Each of the cases and their contents are described in the following three sections: Main Case, INMARSAT M4 Terminal Case, and Laptop and Accessories Case.

Main Case

The main case is a roll-around case containing the following items:

a. KIV-7HS.

b. VTC/Data selector switch.

c. Cable patch panel.

d. ADTRAN IMUX.

e. Polycom ViewStation.

Each item is identified in Figure 2 and described in detail in the following subsections.

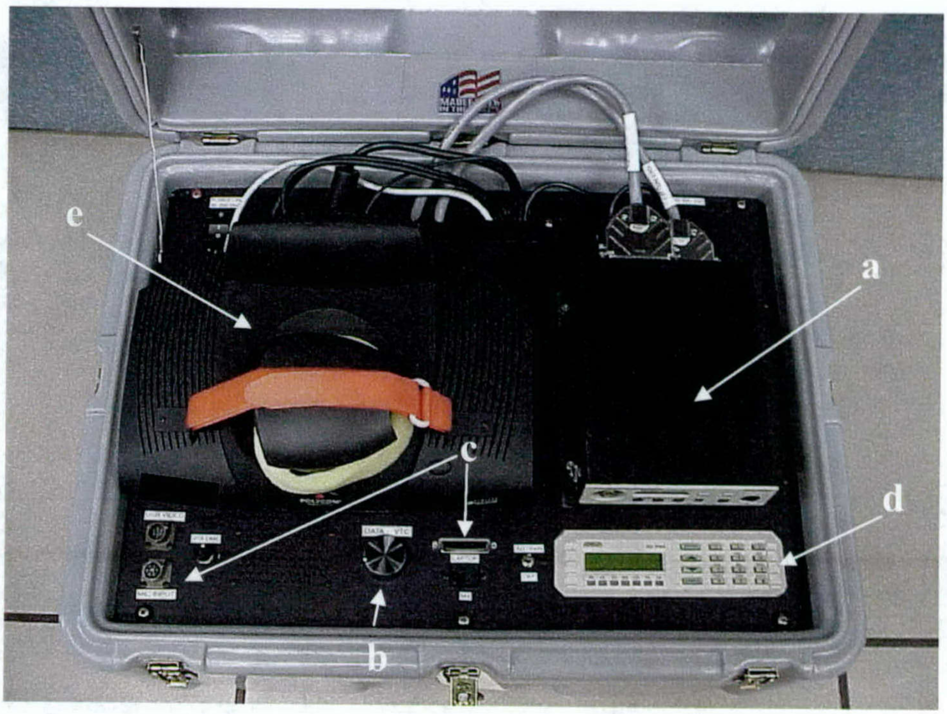

Figure 2. Main case components

KIV-7HS

The KIV-7HS (referred to herein simply as the "KIV") is the National Security Agency-certified high-speed encryption device, which enables secure communications. Secure encryption keys must be electronically loaded into the KIV for secure communications, using a separate fill device. When traveling with the TCE-D, the KIV should be placed in a carry-on bag and carried by the traveler; the traveler must maintain control of the KIV at all times. Be careful not to press the Initiate and Zeroize buttons simultaneously, which deletes the KIV's memory. For additional information, contact your local COMSEC custodian or TEOC personnel.

VTC/Data Selector Switch

A switch is provided to select between video teleconference mode (VTC) and data transfer mode (DATA). The switch simply determines which device, the ViewStation or the data computer, will communicate via the M4 terminal.

Cable Patch Panel

Ports for connections to the laptop video, laptop data transfer Klashopper card, M4 terminal, and the ViewStation microphone are included on the patch panel on the front of the case. More details on these connections are provided in Chapter 3.

ADTRAN IMUX

The ADTRAN IMUX (referred to hereafter simply as "ADTRAN") serves as the system's dialing interface and provides the network termination for the M4 terminal. A keypad on the ADTRAN supports configuration, test modes, test status, and manual dialing operations. See Figure 3 for a closeup illustration of an ADTRAN.

Polycom ViewStation

The Polycom ViewStation (refered to hereafter as "ViewStation") is a versatile video conferencing unit and is interoperable with the KIV and the ADTRAN IMUX; it uses V.35 protocol supporting secure communications. The speaker embedded into the case broadcasts the audio output of the "ViewStation"; video output is displayed on the laptop screen. The case also contains a speaker and volume-control knob.

Figure 3. ADTRAN IMUX

INMARSAT M4 Satellite Terminal Case

The M4 terminal (referred to hereafter as simply the "M4") is transported in a black, hard-sided case; it is the communications backbone for the deployable system. The M4 can operate on practically any global landmass where there is a clear line of sight (LOS) with a satellite. An indoor/phone unit, antenna (outdoor unit), power supply, and antenna cable are included in the M4 case. Figure 4 provides an illustration of the M4.

Laptop and Accessories Case

A third case provided with the system contains the laptop and accessory items such as hand-held camera, power inverter, vehicle battery jumper cables, power extension cord, tool kit, power strips/surge protectors, power connector converters, extra hard disk drive, hard drive recovery CDs, etc. Contents and size of this case will vary, depending on specific mission requirements.

The laptop computer provided with each system facilitates data communications and provides a display for the VTC. An example of a laptop provided with the system is shown in Figure 5.

The laptop is delivered with two hard disk drives (unclassified duplicates). One drive can serve as a system backup, or can be used for classified data while the other drive is kept unclassified. If necessary, both drives may be converted to

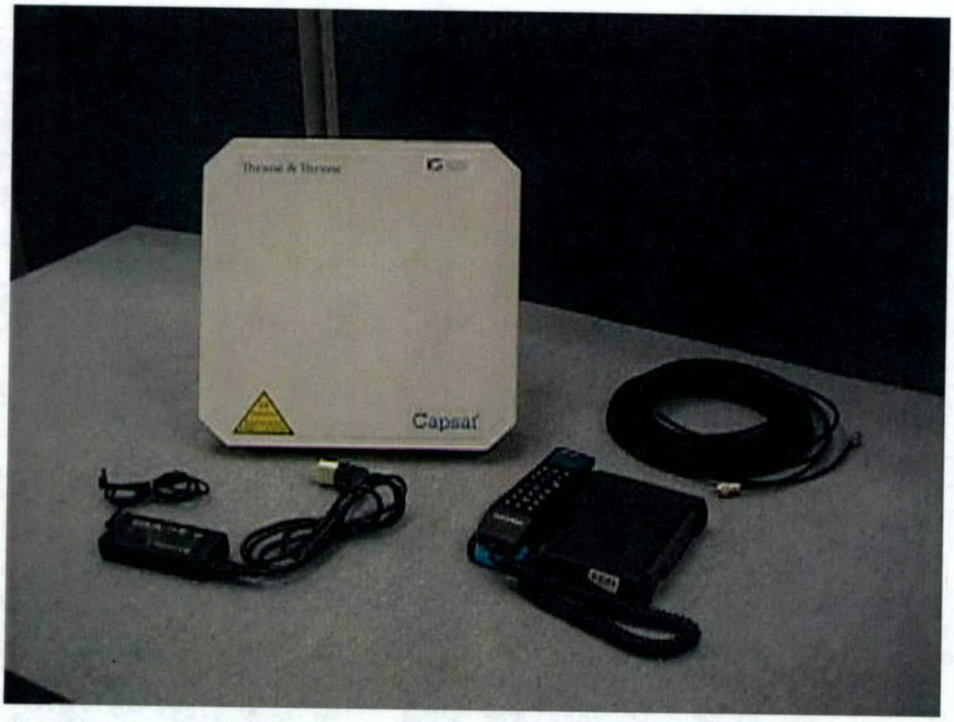

Figure 4. M4 terminal

Figure 5. Laptop

classified drives. They should be handled in accordance with existing regulations.

The laptop is equipped with a Klashopper digital data communications card (referred to hereafter as the "Klashopper"). It is installed in a PCMCIA slot and is operational upon delivery; no further user setup is required. Figure 6 provides an illustration of the Klashopper installed with the cable attached.

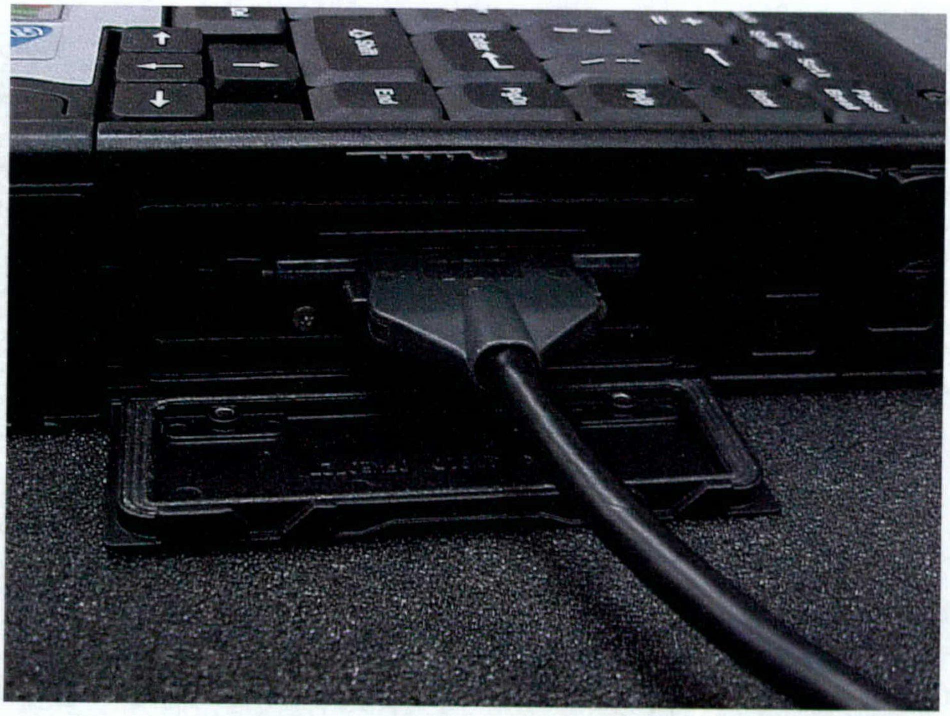

Figure 6. Klashopper card installed

Figure 7 provides an illustration of some other items that may be included in this case.

Figure 7. Accessory items

3 Setup

Overview

The system's compact design simplifies setup effort by reducing the number of steps required to make the system operational. Ports and cables are labeled to easily identify proper connections. Interconnections between major components within the main case are permanent to ensure proper connections and simplification of the setup process.

The following sections, "Setting up the M4" and "Setting up the Main Case," describe the steps necessary to make the system operational. In all instances, always set up the M4 first. This serves three purposes: (1) to determine if satellite service can be established at your location, (2) to establish a "READY" mode on the M4 before the main case is powered, and (3) to reach the TEOC if technical assistance is needed.

Instructions for setting up the accessories (for example, power inverter for 12-V DC power conversion and the hand-held camera) are provided in Chapter 5.

Setting Up the M4

The M4 case contains the satellite terminal indoor unit (IDU), the antenna outdoor unit (ODU), antenna cable,[1] power cable, and M4 documentation. Figure 8 provides an illustration of the M4 case and its contents.

Remove the antenna cable, power supply, and documentation from the case and set aside. Next, remove the ODU (also referred to herein as the "antenna") from the case and open the support leg bracket as illustrated in Figure 9.

Next, place the unit on a steady surface, as illustrated in Figure 10. Use the knobs to tighten the support leg bracket. See Figure 11.

[1] An extension cable (20 m+) and a "barrel" connector are provided with each system in the M4 case.

Figure 8. M4 case and contents

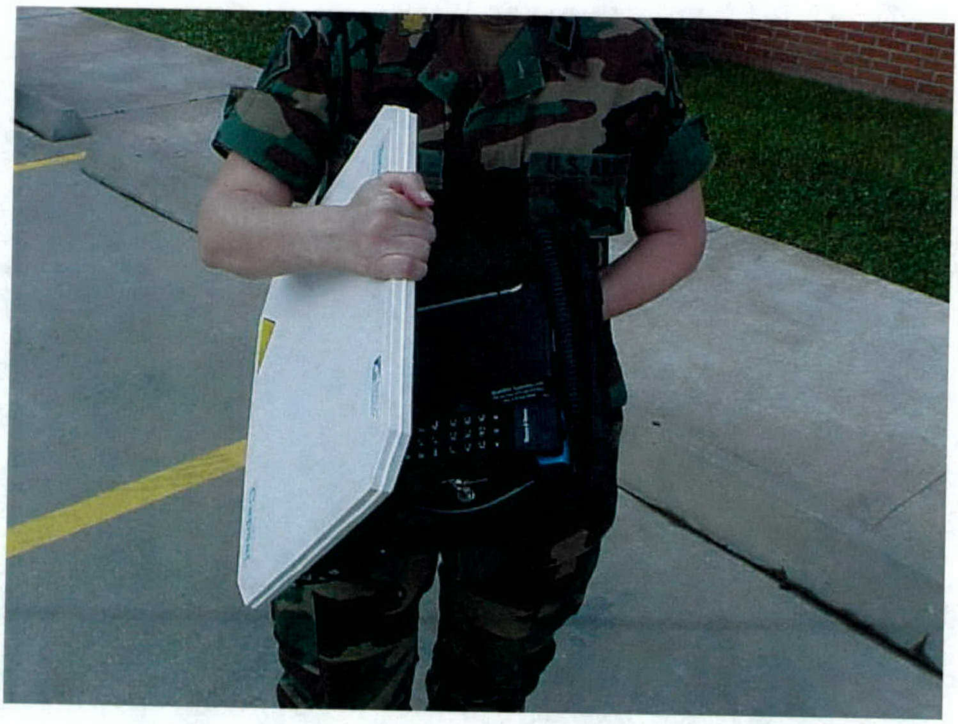

Figure 9. Opening the leg bracket on the ODU

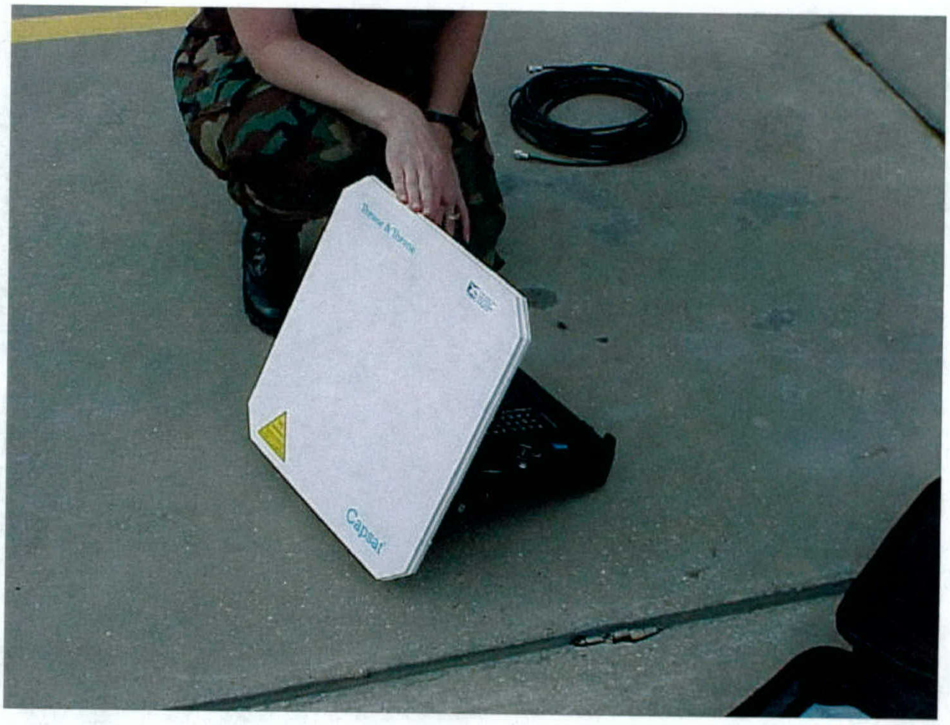

Figure 10. Placing the antenna on a steady surface

Figure 11. Tightening the antenna base

Place the antenna in a location where the unit will not be in the path of personnel. It is a microwave radiation hazard and should be handled accordingly. See the front panel of the antenna for safe operating distance.

Aim the antenna in the general direction where a clear LOS can be obtained with a satellite. To obtain a general direction and angle for the ODU, refer to the M4 documentation for the "Antenna Azimuth Elevation Map." See Figure 12. When the IDU is powered on, the satellite located in the general view of the ODU will be selected.

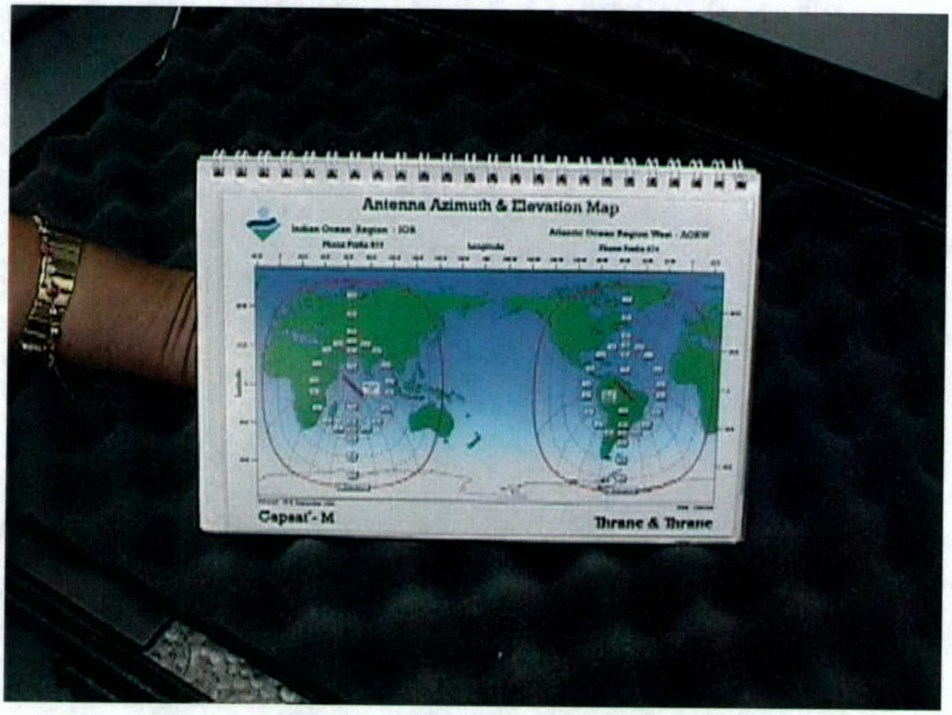

Figure 12. Antenna azimuth elevation map

The M4 can operate on battery power, which can be used during the initial M4 setup steps, or the unit can be plugged into AC power, using an adapter if necessary, as illustrated in Figure 13. When the unit is connected to AC power and the system powered, the M4 will operate on AC power and the M4 battery will be recharged. Adapters are provided so that the terminal can be powered with 220 V and 110 V. The unit itself automatically senses the input voltage and switches accordingly.

Plug the other end of the power adapter into the phone unit or IDU, as shown in Figure 14.

At this point, with the IDU contained within the ODU, and connected by the small "pig tail" cable, you can power up the M4 to establish connectivity with a satellite. Chapter 4 provides instructions on making a nonsecure voice call. Before removing the IDU from the ODU and installing the long antenna cable(s),

Figure 13. Connecting M4 power supply to AC power

Figure 14. IDU antenna cable connection

ensure the M4 is powered off by depressing the power button on the handset for 5 sec. The handset display will indicate when to release.

Next, with the M4 powered off, separate the IDU and ODU and remove the short "pig-tail" cable; connect the IDU and ODU via the antenna cable. Exercise caution when handling this cable; ensure the cable does not "kink," causing an internal break. Various lengths of these cables are available. Figure 15 illustrates the connection of the cable to the IDU; Figure 16 illustrates the ODU connection.

Next, turn the terminal on by pressing the power button. See Figure 17.

The system will require a few moments to initialize. While initializing, the display will read "INITIALISING"; then, the unit will be ready for final alignment. Simply hold the antenna and slowly "sweep" the antenna left to right, up and down, as demonstrated in Figure 18.

Turn on the tone indicator by pressing and releasing the "2nd" button followed by the 9 button. Once the M4 detects a satellite, the tone emitted by the ODU will periodically beep. A faster beep indicates a better signal. The display on the IDU indicates the signal to noise (S/N) ratio in decibels (db); a value of 55 db or higher is desired. Adjust the angle and bearing until the fastest beeping and highest S/N ratio can be achieved. Once you are satisfied with the signal strength, place the antenna on a sturdy surface, maintaining the antenna's angle and bearing. Press the "OK" button (Figure 19) on the handset. The tone indicator may be turned off by pressing the "2nd" button followed by the 9 button. Signal strength bars continue to be displayed; better signals produce more bars.

At any time while the M4 is "on," you can view a numeric S/N ratio indicator by pressing the "2nd" button followed by "menu." On the menu, scroll down to "Status" and select by pressing "OK"; then select "C/No." The handset will display the S/N ratio. Continue to press "Exit" until the handset returns to "Ready."

After the system "locks" onto a satellite, the system will register itself with the satellite. Verify a "READY" indication on the IDU display. (Note: The "AORW:FRANCE" message may or may not appear on your handset.) To test the connection, place a nonsecure voice call. Refer to Chapter 4 for instructions. Use sandbags or other materials to firmly secure the antenna in place by securing the base. Keep the cable and antenna out of pedestrians' way.

Setting Up the Main Case

Place the main case on a flat, level, sturdy surface with the lid side facing up. Open the case. Turn the case so that the ViewStation is facing toward the VTC participants. Remove the orange Velcro® strap and foam collar from the ViewStation, as illustrated in Figure 20.

Figure 15. Connecting the M4 power supply to the M4 IDU

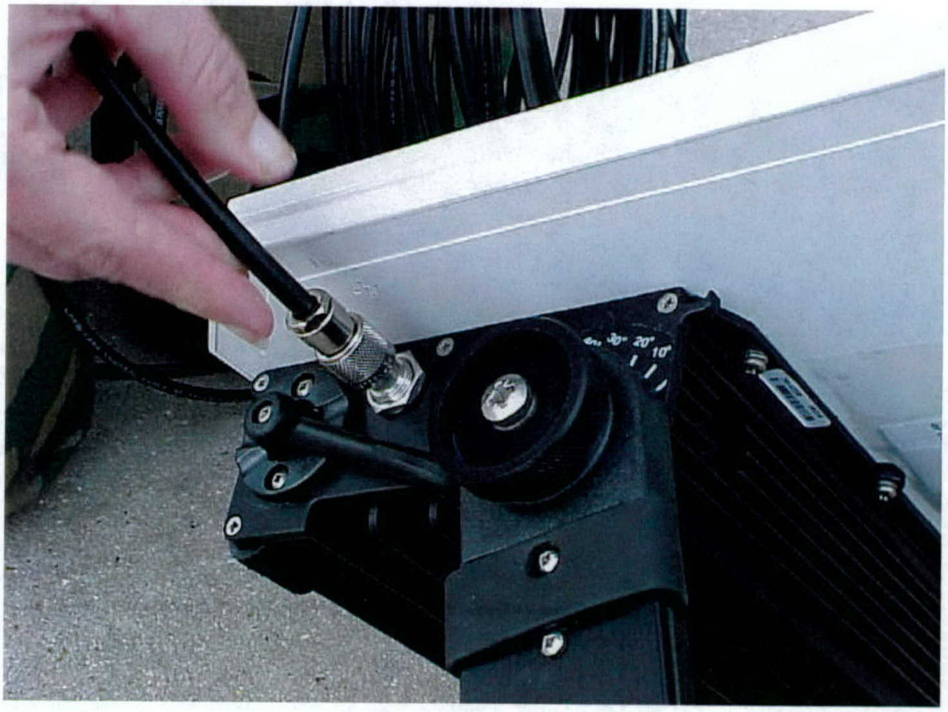

Figure 16. ODU cable connection

Figure 17. IDU power button

Figure 18. Adjusting the ODU

Figure 19. OK button on handset

Figure 20. ViewStation with Velcro® R strap and foam collar

If you will be communicating in the secure mode, you must install the KIV. Open the KIV holder by loosening the spring-loaded buckles on both sides, as shown in Figure 21.

Raise the holder and insert the KIV into place, as shown in Figure 22.

Close the holder and secure the buckles. Connect the KIV data cables and the KIV power supply cable, as shown in Figure 23.

If you will be operating in the nonsecure mode, connect the KIV data cables together as shown in Figure 24, thus bypassing the KIV.

Connect the port labeled "M4" (Figure 25) on the gray case to the ISDN port on the rear of the M4 satellite phone (Figure 26) using the network cable.

Figure 27 provides an illustration of the cable for this connection.

Connect the Klashopper card in the laptop to the main case laptop port shown in Figure 25.

Figure 28 provides an illustration of the cable connected to the Klashopper card.

Connect one end of the cable shown in Figure 29 to the universal serial bus (USB) video port on the main case (Figure 30). This is a "keyed" connector. Simply rotate the connector until the connector "drops" into the port; then, turn the "sleeve" clockwise until the connector locks onto the port.

Connect the other end of the cable to the USB port on the rear of the laptop, as illustrated in Figure 31.

Connect one end of the cable shown in Figure 32 to the microphone in (MIC IN) port on the main case (Figure 30). This is also a "keyed" connector, operating similarly to the USB video cable.

Connect the other end to the ViewStation microphone, as shown in Figure 33.

Connect the female end of the main case power cord to the port on the case, as shown in Figure 34. Ensure the power switch is in the "off" ("0") position.

Connect the other end of the cable to an AC power source; use an adapter if necessary. The system can accept 90 to 240 V AC for input power. Finalize the laptop setup by connecting the laptop to an AC power source; boot the laptop.

Figure 21. Loosening the spring-loaded buckles on the KIV holder

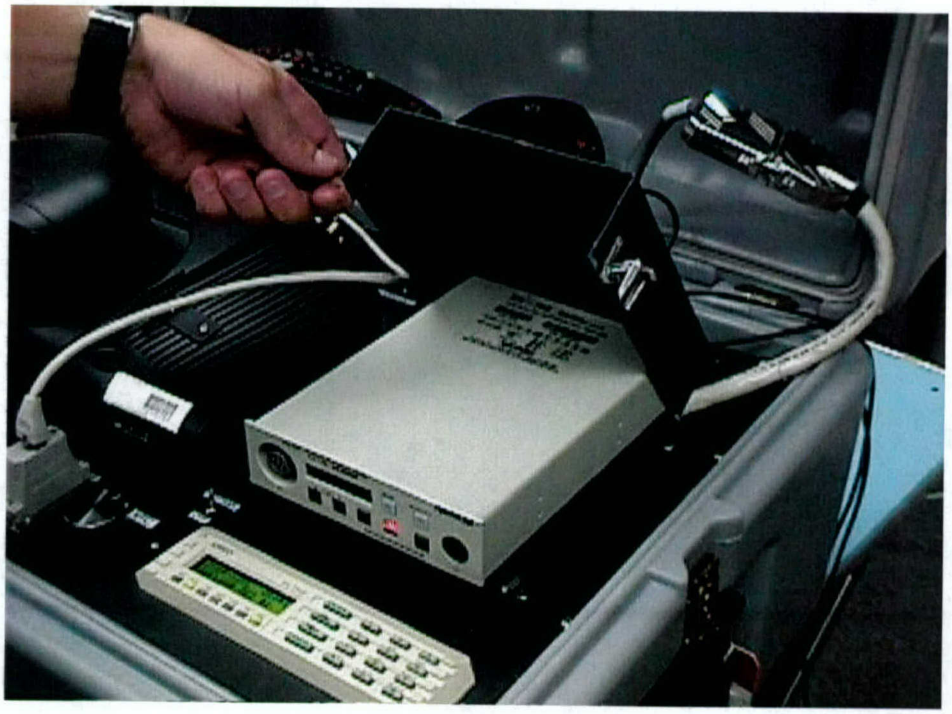

Figure 22. KIV holder opened and KIV inserted

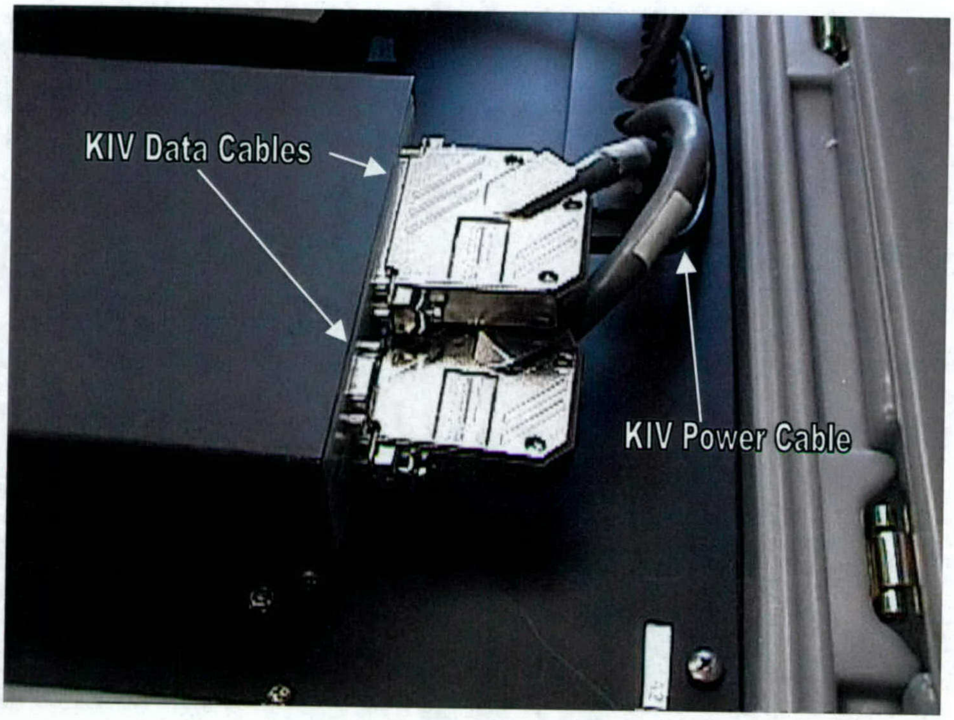

Figure 23. KIV data cables and power supply cable connected

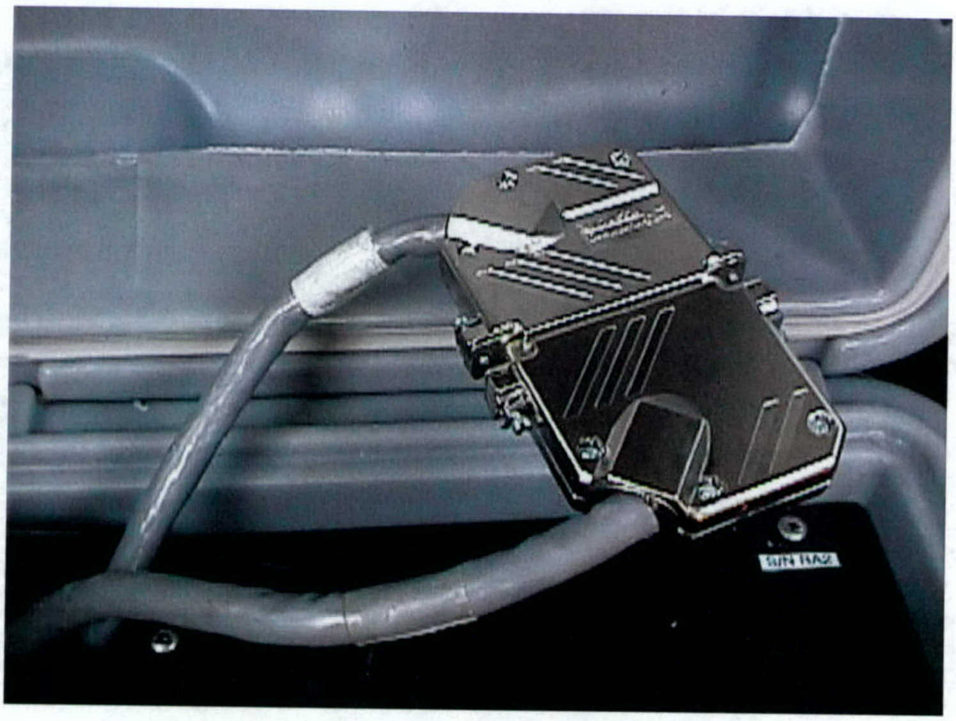

Figure 24. KIV data cables bypassed

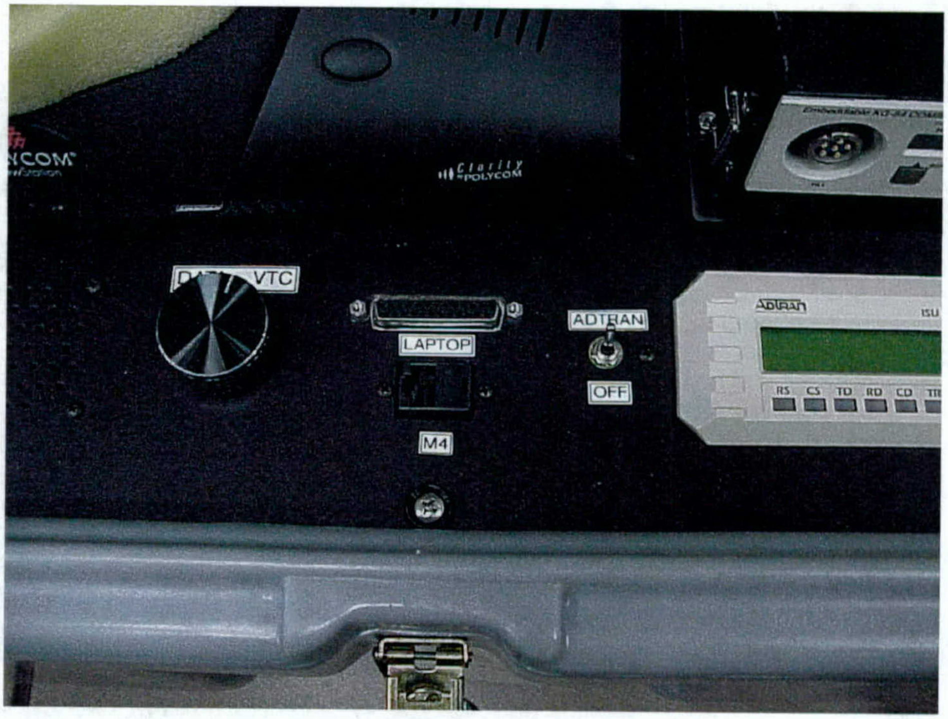

Figure 25. M4 port and laptop port on main case

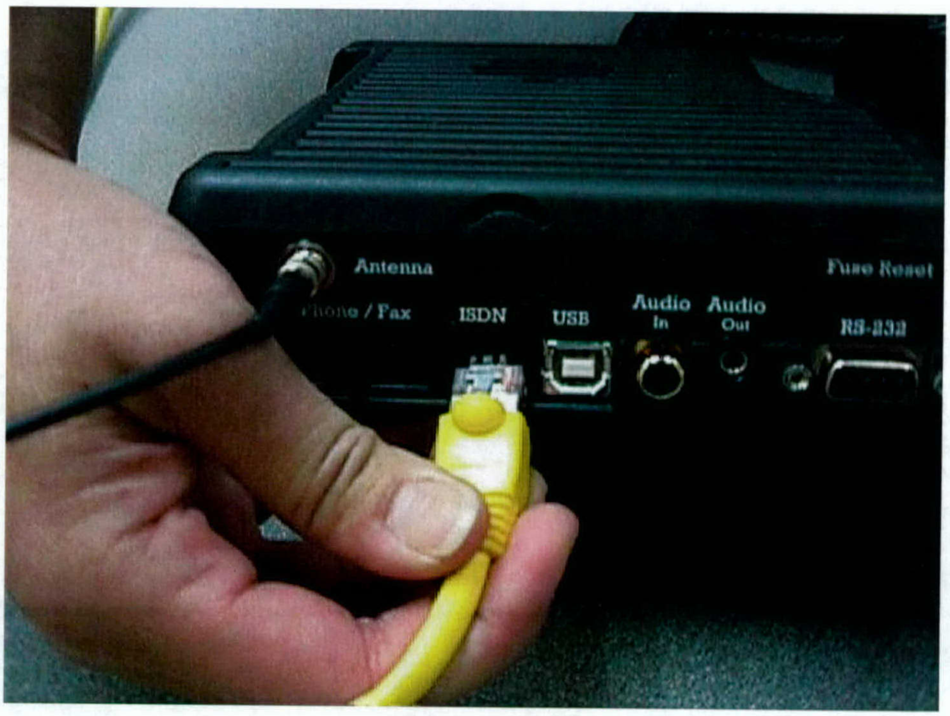

Figure 26. Connecting to the ISDN port on the M4

Figure 27. Cable for M4 port to ISDN port connection

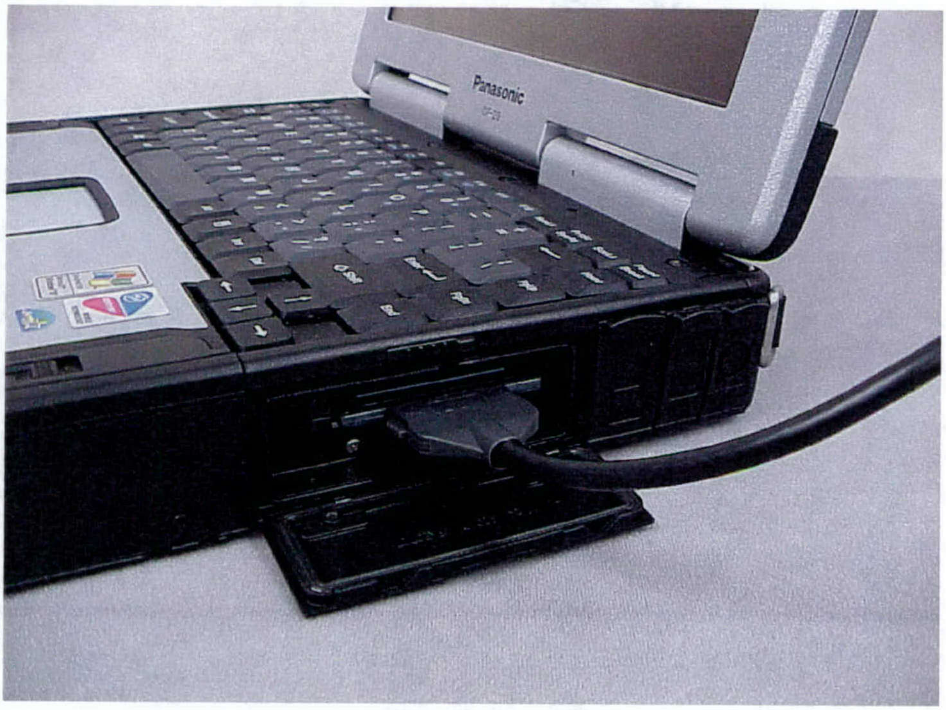

Figure 28. Cable connected to Klashopper card

Figure 29. USB video cable

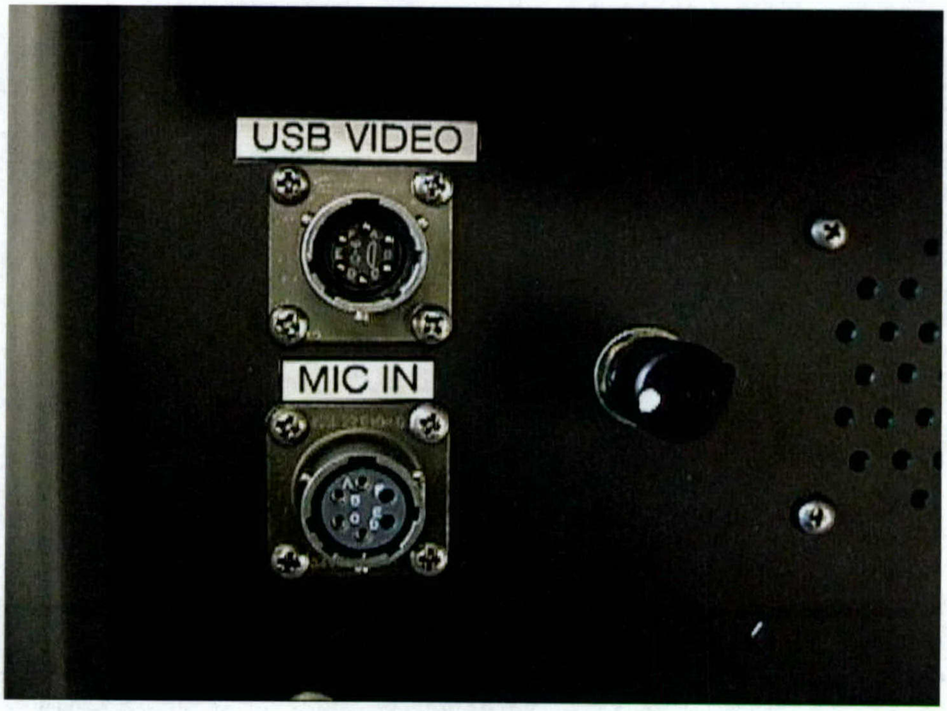

Figure 30. USB video port, MIC IN port, and volume control on main case

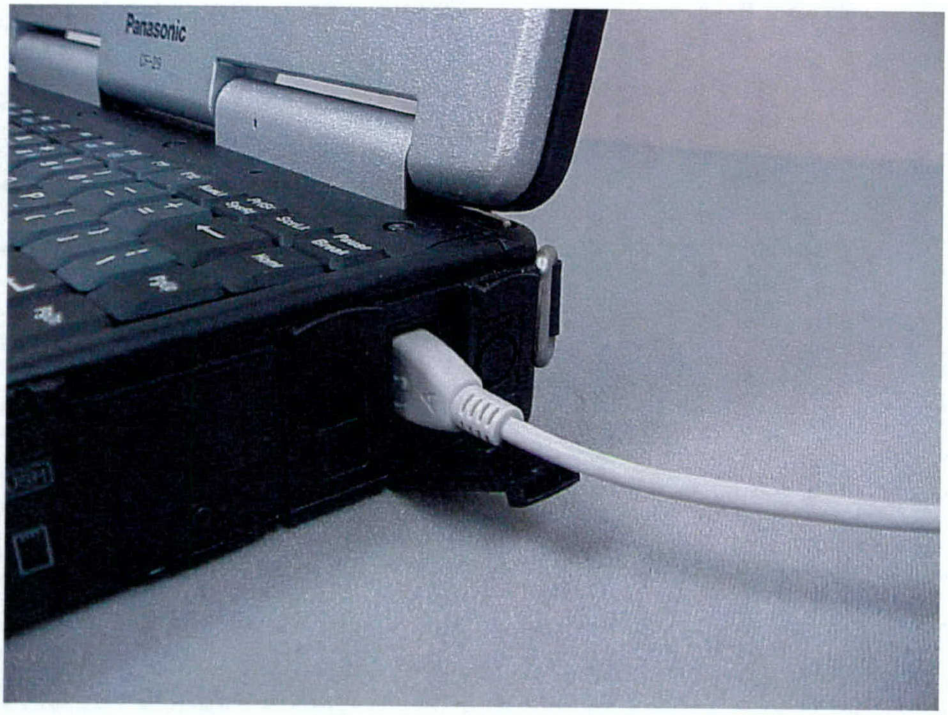

Figure 31. USB port on the side of the laptop

Figure 32. “MIC” cable

Figure 33. Connection of microphone cable to the ViewStation microphone

Figure 34. Main case power connection and switch

4 Operation of the System

The following sections provide instructions on the operation of the system. First, basic operations necessary for initializing the system will be presented. Instructions on powering up the system will be presented, followed by instructions for making a nonsecure voice call. Then, steps for conducting VTCs and transferring data will be presented. Appendixes A and B provide quick reference guides for these operations.

Powering Up the System

To ensure proper operation of the system, power up the components in the order described in this section.

Always ensure that the M4 unit is fully operational and is "READY" before powering up the main case. Ensure the ViewStation, ADTRAN, and KIV (if the KIV is connected) are in the off position. Then, turn the power switch to the "on" position (Figure 34) on the main case. Allow 5 sec for the power to stabilize. Turn the ADTRAN to the "on" position with the switch shown in Figure 35.

Wait for the ADTRAN to display a ready message, as shown in Figure 36.

If the KIV is connected, insert the crypto ignition key (CIK) and rotate the CIK clockwise one-quarter turn to the "on" position, as shown in Figure 37.

The KIV will "beep," and messages will appear on the KIV display. Messages appearing are as follows: "Testing," "Batt Good," "Key Good," and finally, "FDX." If any other messages appear, contact the TEOC. After the FDX message appears and remains in the display, the Online button will flash, indicating the system is ready for a secure call. If the call is nonsecure, the KIV must be completely removed from the system (bypassed) by disconnecting the two cables from the RED and BLACK ports of the KIV, and connecting the two cables.

Now, turn on the ViewStation. The ViewStation switch is located on the left rear of the ViewStation and is illustrated in Figure 38.

Boot the laptop. The system is now ready for operation.

Figure 35. ADTRAN power switch

Figure 36. ADTRAN displaying ready message

Figure 37. CIK inserted and rotated one-quarter turn clockwise to on position

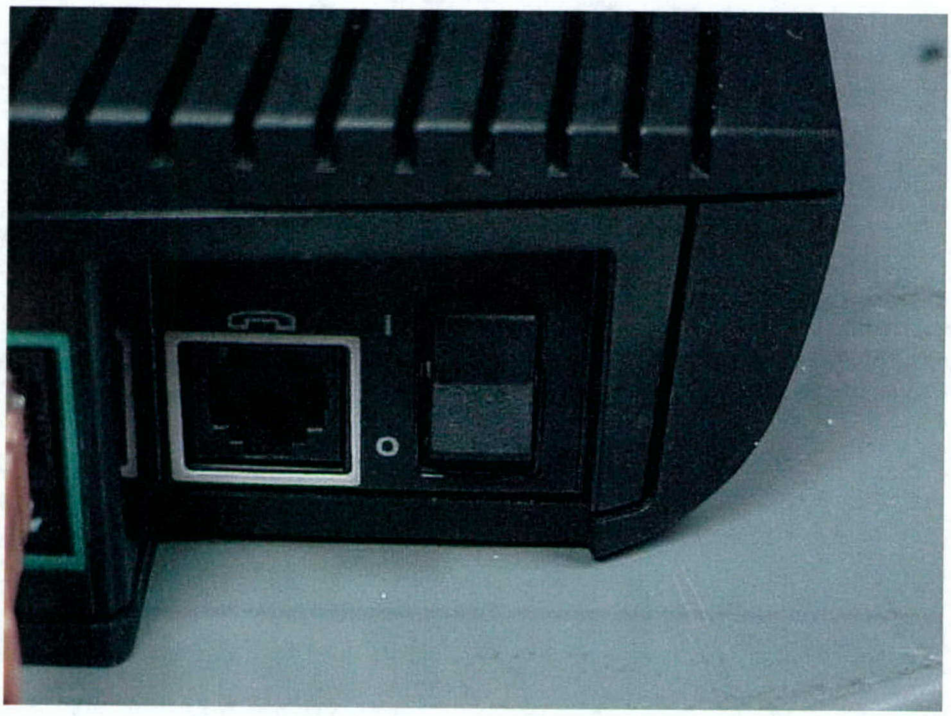

Figure 38. ViewStation power switch

Conducting a Voice Call

To test the connection, place a nonsecure voice call as follows:

Lift the handset and simply dial 00 + country code + area code + number and press "OK." The following is an example for dialing the United States.

00 1 555 555 5555 **OK** (USA)

Conducting a VTC

To initiate a VTC, ensure the selector knob is positioned to VTC. The laptop screen will be used as the video monitor. Log on to the laptop and start the WinTV2000 software on the laptop by double-clicking on the WinTV2000 icon (Figure 39).

Figure 39. WinTV2000 icon

Press the TV mode icon (Figure 40) in the lower right of the WINTV2000 window to change the monitor to full-screen display.

If the ViewStation is powered up, a start screen similar to the one in Figure 41 should appear on the display. When conducting a secure VTC, it is a requirement to start at this screen.

Figure 40. Changing the monitor to full-screen mode

Figure 41. Start screen

Various functions of the ViewStation can be controlled with the remote control (Figure 42).

Figure 42. ViewStation remote control

Some of the more commonly used keys on the remote control are

a. *Volume keys*. Located on the right side, increases or decreases the audio output of the ViewStation. Remember, the main case speaker also has a volume control.

b. *Green key*. Located at the top of the remote control, selects from a start screen to a full screen and vice versa.

c. *Maroon arrow keys*. Located near the top of the remote control. After a full screen has been activated, the keys can be used to rotate the ViewStation camera to obtain a desired view. The center key functions as "select."

d. *Zoom key*. Located on the left side; used to "zoom" the ViewStation camera.

For a secure VTC, ensure that the KIV is connected properly.

On the ADTRAN keypad, press "#" to access the dialing options. Press Enter to select DTE #1, "2" (Dial Number) to dial number, then, Enter. Enter the ISDN number; for example, enter "0016015555555" and press Enter. The

ADTRAN display will read "Dialing," "Connecting," "Bonding Setup," followed by "Clear Channel 64000."

KIV synchronization should occur automatically, and the ViewStation should connect with the distant end. If the screen does not go "full screen," press the green button on the remote. The TD & RD lights should flash on the ADTRAN. If necessary, press the INITIATE button on the KIV to accomplish KIV lock.

To terminate communications, press the "#" key to bring up the dialing options. Press Enter twice to "hang up" the call. The display will present a ready message when the call is terminated. Always ensure that the M4 handset returns to the READY mode after a VTC to avoid unnecessary airtime charges.

Transferring Data Using the KlasPeer2Peer Software

KlasPeer2Peer is used to facilitate point-to-point data transfer. The TCE-D will initiate the data transfers by contacting a TCE-fixed (TCE-F) site that is "listening" for the call. The TEOC's two TCE-Fs remain in the "listen" mode. One TCE-F is connected to a KIV for receiving calls; the other, without a KIV, is listening for nonsecure calls.

Perform the following steps to send or retrieve files to/from the TEOC's TCE-Fs. Ensure all cables are connected and the system is ready to make a call.

On the laptop's desktop, double-click on the KlasPeer2Peer icon (Figure 43) to start the software.

Figure 43. KlasPeer2Peer icon

Double-click on the TEOC connection configured on the system (Figure 44). Connections to other TCE-Fs can be provided; contact the TEOC for setup.

In the "Connect TEOC" window, enter your username and password. (See Figure 45.) Do not press "Dial" at this time.

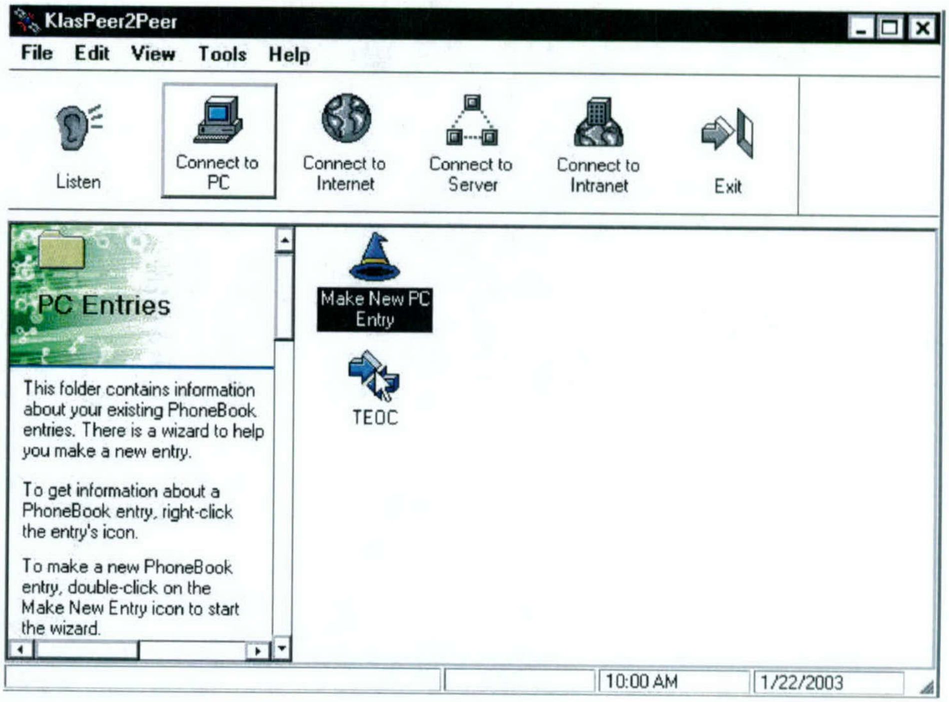

Figure 44. TEOC connection icon

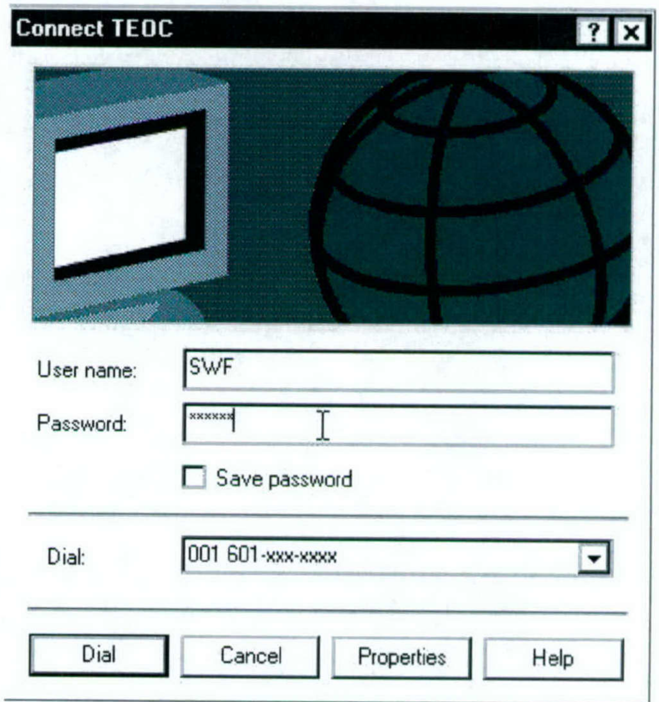

Figure 45. Entering user name and password

Dial the number to the TEOC TCE-F on the ADTRAN:

a. Press "#," ensure DTE #1 is flashing (selected), and press Enter.

b. Press "2" (Dial Number) and press Enter.

c. Enter the number of the TCE-F and press Enter.

When the ADTRAN displays "CLEAR CHANNEL 64000," press the Dial button on the "Connect TEOC" window. (See Figure 46.) The system will verify your user name and password. In secure mode, it may be necessary to press INITIATE to accomplish KIV-lock.

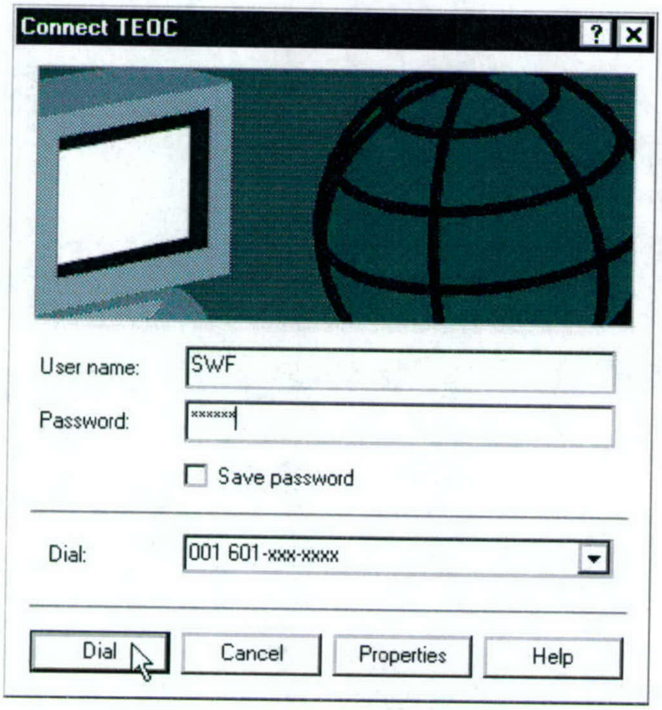

Figure 46. Pressing dial on the Connect TEOC window

If the connection is successful, an info screen will appear informing you of the IP addresses for your machine and the far (TEOC) computer. Click "OK." (See Figure 47.)

On the next screen, double-click on the File Transfer icon. The icon is illustrated in Figure 48.

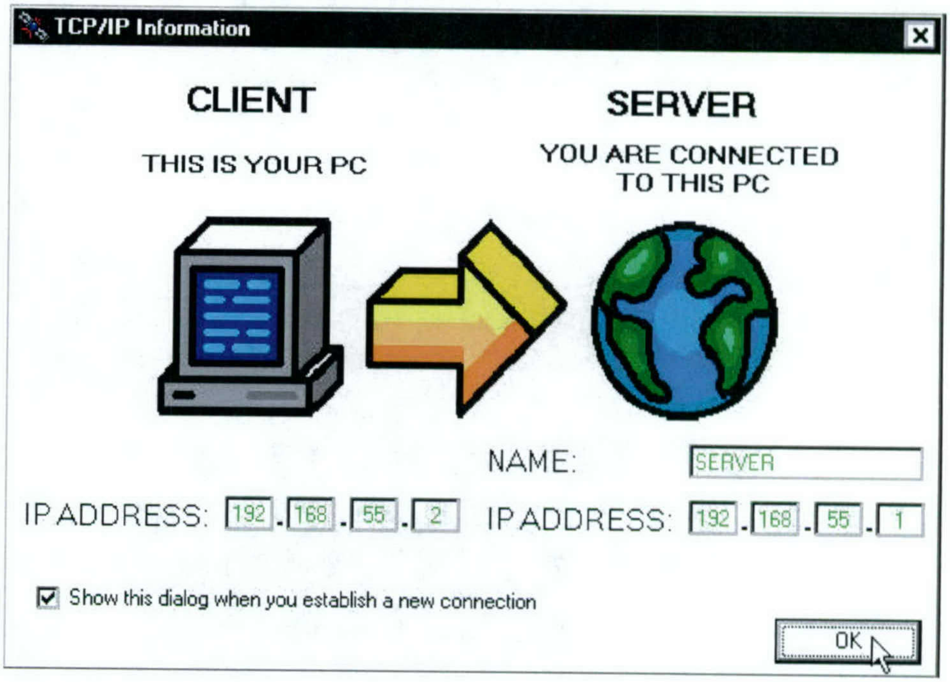

Figure 47. TCP/IP Information window

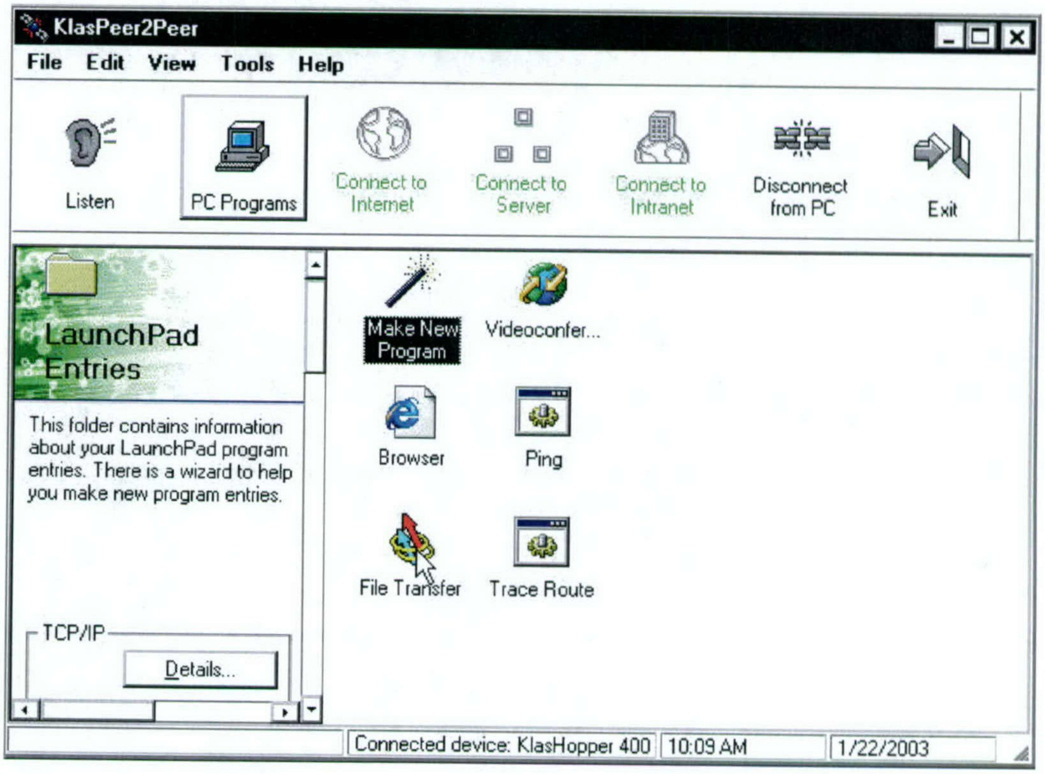

Figure 48. Selecting File Transfer icon

Select (double-click) SERVER from the WS_FTP Sites window as shown in Figure 49.

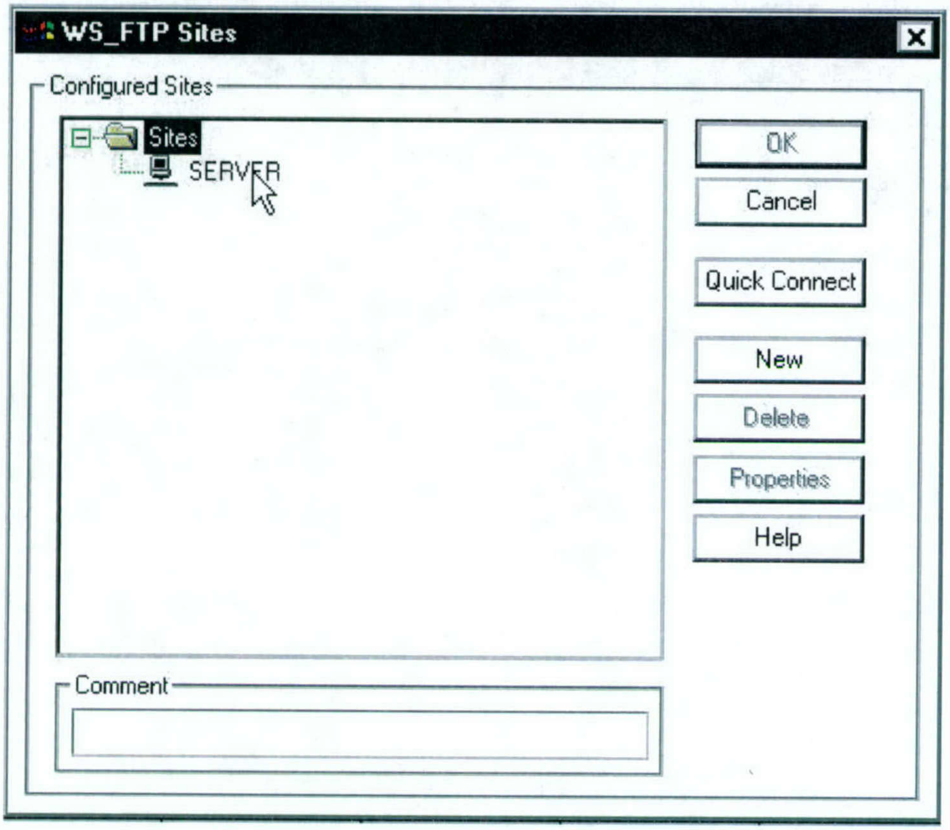

Figure 49. Selecting the TEOC Server site from the WS_FTP sites list

A WS_FTP window will appear, as shown in Figure 50, showing a folder and its contents for your laptop (Local System) and for the far site (Remote Site). Freely change folders as desired and move files between the two sites by highlighting the file(s) of choice and using the arrow buttons in the center of the screen to define the "direction" of the transfer and to initiate the transfer.

When finished, exit all software and hang up the ADTRAN by pressing #, Enter, Enter.

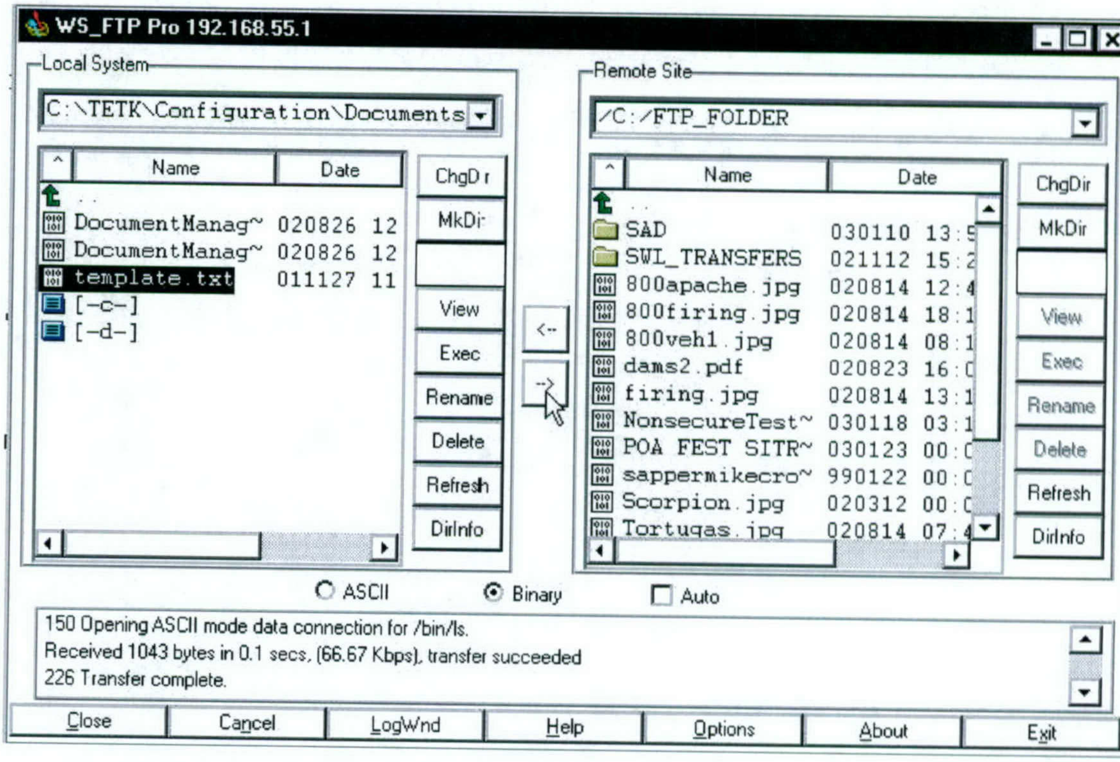

Figure 50. WS_FTP Window for moving files

5 Additional Topics

Each section in this chapter covers additional operational topics, including the use of a hand-held camera, using 12-V DC vehicle power with the system, connecting to the internet, and displaying computer displays (such as PowerPoint® slides) during a VTC.

Using a Hand-Held Camera

A hand-held digital camera is provided with each TCE-D. An illustration of this camera is provided in Figure 51. This camera can be used with the system as a secondary live-video feed source, as a source for playing back digital stills or digital video during a live VTC, or as a source of digital images and video clips to send via the data transfer capabilities.

The camera contains a memory stick and a digital tape to store images and video collected (see Figure 52). The following sections discuss those uses and provide necessary instructions.

Live video

To use the camera as a second live-video source during a VTC, you will need the cable shown in Figure 53. The cable contains three RCA connectors on one end and, on the other end, one single male connector. Connect the male connector to the camera port (illustrated in Figure 54). The other end of the cable should be plugged into the "in" port on the rear of the ViewStation, as illustrated in Figure 55. Only the yellow (video) cable connector should be connected if you are using the ViewStation microphone. (Connecting the white or red cables will cause feedback problems during a VTC.)

During a VTC, the hand-held camera may be selected as the video input source by pressing "Near" on the ViewStation remote and selecting the VCR icon, as shown in Figure 56. Use the arrow keys and the select button on the remote to make the selection. You may switch back to the ViewStation's camera by selecting the "Camera" icon after pressing "Near" on the remote.

Figure 51. SONY® MVC CDR-1000 camera

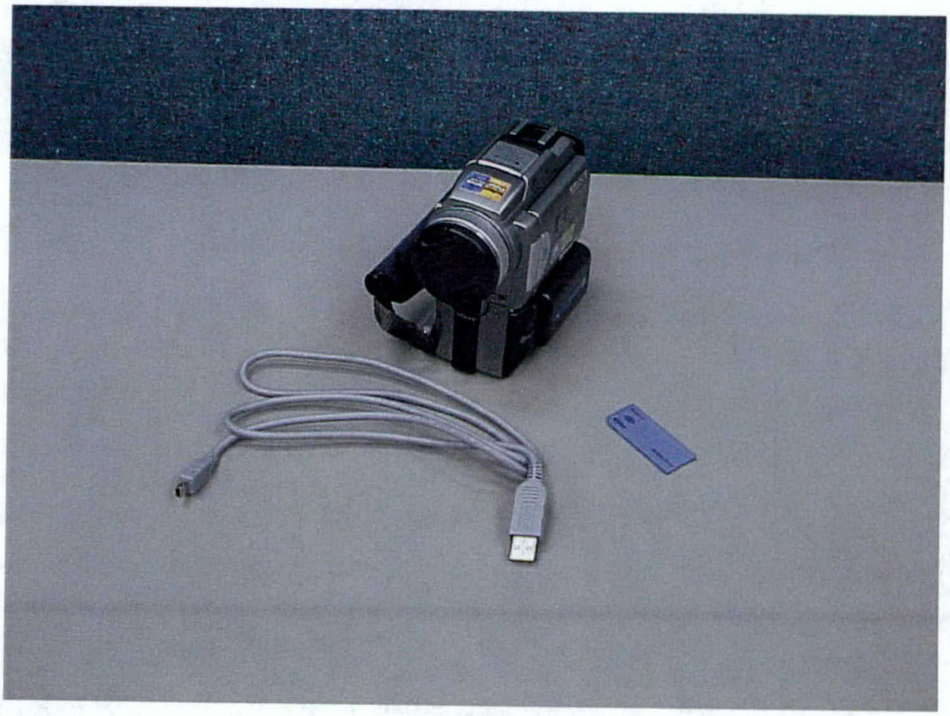

Figure 52. SONY® MVC CDR-1000 with memory stick and floppy adapter

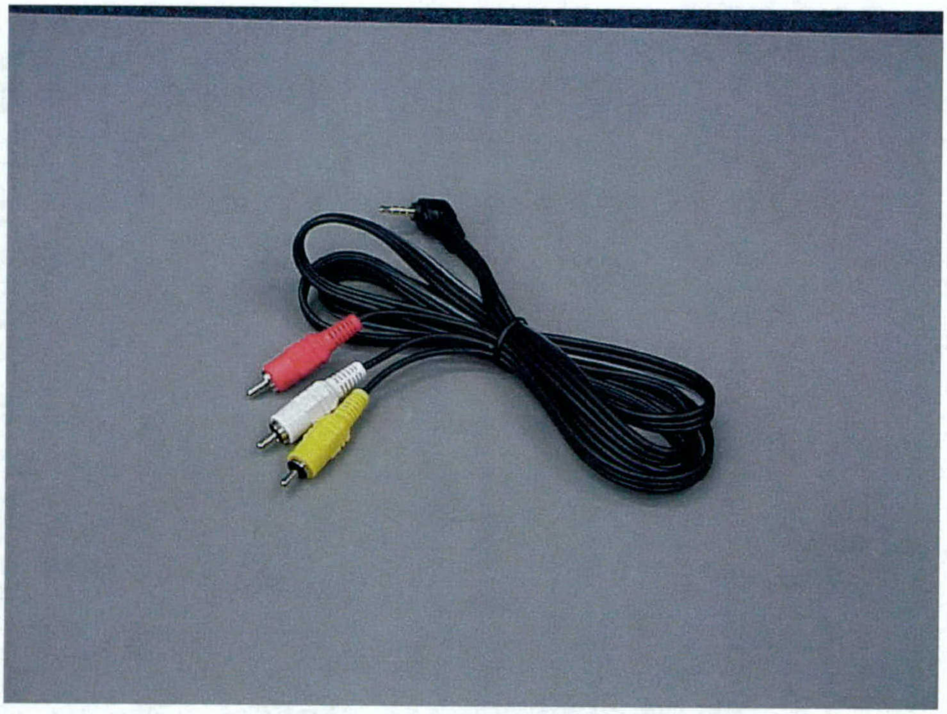

Figure 53. Cable for palmcorder connection to the ViewStation

Figure 54. A/V port on camera

Figure 55. VCR IN jack on the rear of the ViewStation

Figure 56. Video source selection screen

Playback during a live VTC

To play back videos and digital stills during a VTC, you will need to connect the cable in the same way as for a live-video feed (see Figure 53). Use the camera to play from memory or the tape. Select the camera by pressing "Near" on the ViewStation remote and selecting the VCR icon, as shown in Figure 56. Refer to the SONY camera's user manual for details on using these features.

Transferring digital stills and digital video to the hard drive

You can connect this camera directly to the USB port on the laptop via the cable illustrated in Figure 57. Connect the smaller end of the cable to the camera port illustrated in Figure 58. The laptop will recognize the camera as a removable disk, and it will appear with a drive letter in Windows Explorer. Before disconnecting this camera from the laptop, ensure that proper "ejection" procedures are followed. Click on the icon illustrated in Figure 59 to eject the camera cable.

Vehicle Power

The system is designed to operate on a 90- to 240-V AC power source. If only DC power is available, such as that from a 12-V DC automotive system, the ProSine power inverter can be used to convert the 12-V DC to 110-V AC with sufficient current to operate all system components. Figure 60 illustrates the ProSine inverter (referred to hereafter as simply "ProSine") and jumper cables.

The 12-V DC inverter can be used with military vehicles like the HMMWV, but must be connected to only one battery. Remove the seat over the batteries and connect to the "low" side battery. Connecting across both batteries (24 V) will damage the inverter and render it inoperable.

To use the inverter, ensure that the ProSine's power switch is in the "OFF" position. Using the automotive battery jumper cables, connect the positive terminal on the rear of the ProSine to the positive terminal of the vehicle's 12-V DC battery; connect the negative terminal of the ProSine to the negative battery terminal. Crank the vehicle and turn the ProSine "ON." Never crank the vehicle with the ProSine in the "ON" position.

With the power switch on the main case in the "OFF" position, connect the power cord to the ProSine; then, turn the power switch to "ON." Protect the ProSine and cords in damp/wet conditions to ensure safety of personnel. Ensure the ProSine is kept as cool as possible. Provide adequate ventilation to the cooling fan and keep the unit shaded.

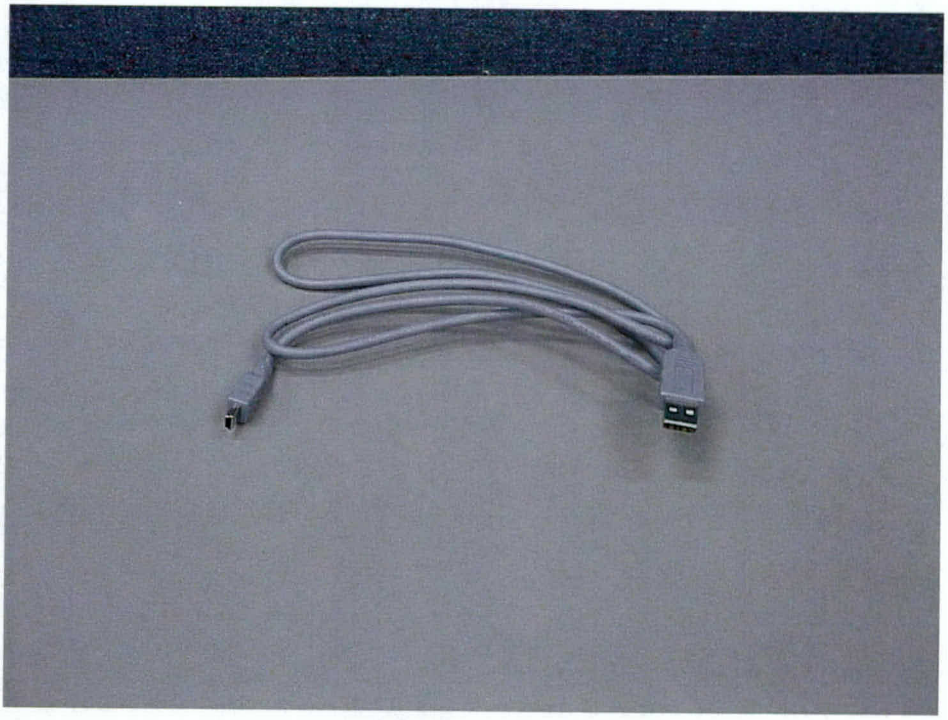

Figure 57. USB camera cable

Figure 58. USB port on camera

Figure 59. "Eject Device" icon

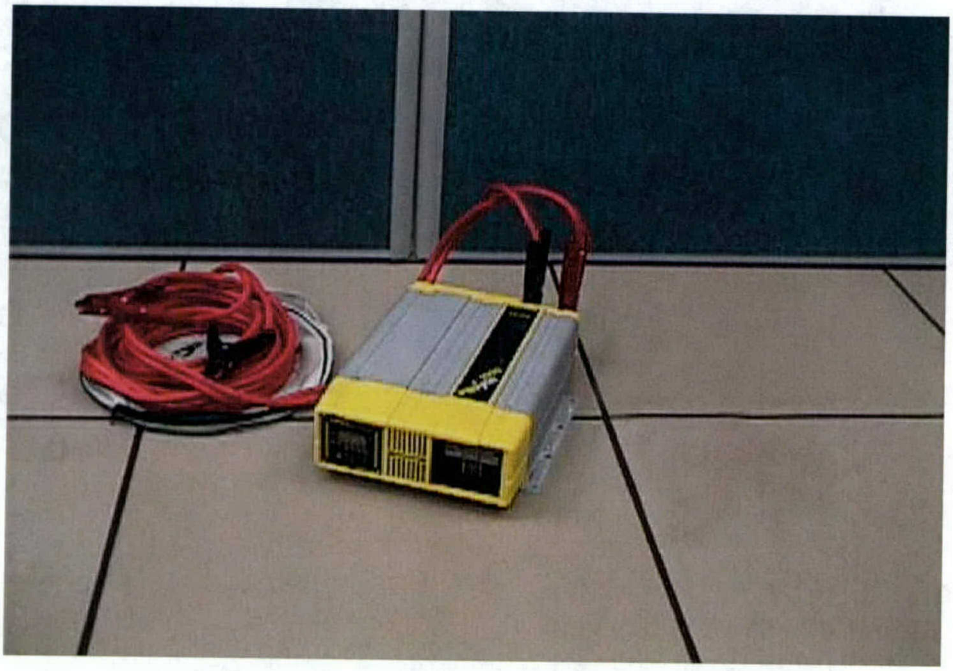

Figure 60. ProSine inverter with jumper cables

Connecting to the Internet

A Klashopper card may be installed in the computer for connection to the Internet. Use of this feature requires additional setup and a dial-up Internet service. Some Government organizations provide a dial-up number for personnel to check email while personnel are away on travel. A commercial Internet service provider can be used to provide the service. One of these capabilities will be required for this feature. Contact the TEOC staff for instructions.

Displaying Computer Images

Computer images, such as PowerPoint® slides, can be displayed over the VTC to the far sites. Simply connect the monitor jack on the laptop to the VCR IN jack on the rear of the ViewStation (as shown in Figure 61) via a scan

Figure 61. VCR IN jack on rear of ViewStation

converter; if the laptop is equipped with a "video-out" port, simply connect a cable straight from this port to the rear of the ViewStation.

The hand-held camera and laptop cannot be hooked up to the ViewStation unit simultaneously. During a VTC, the laptop output may be redirected to the ViewStation by pressing the "NEAR" button on the remote and selecting the VCR device, as shown in Figure 62. The far site will now see the output of the laptop.

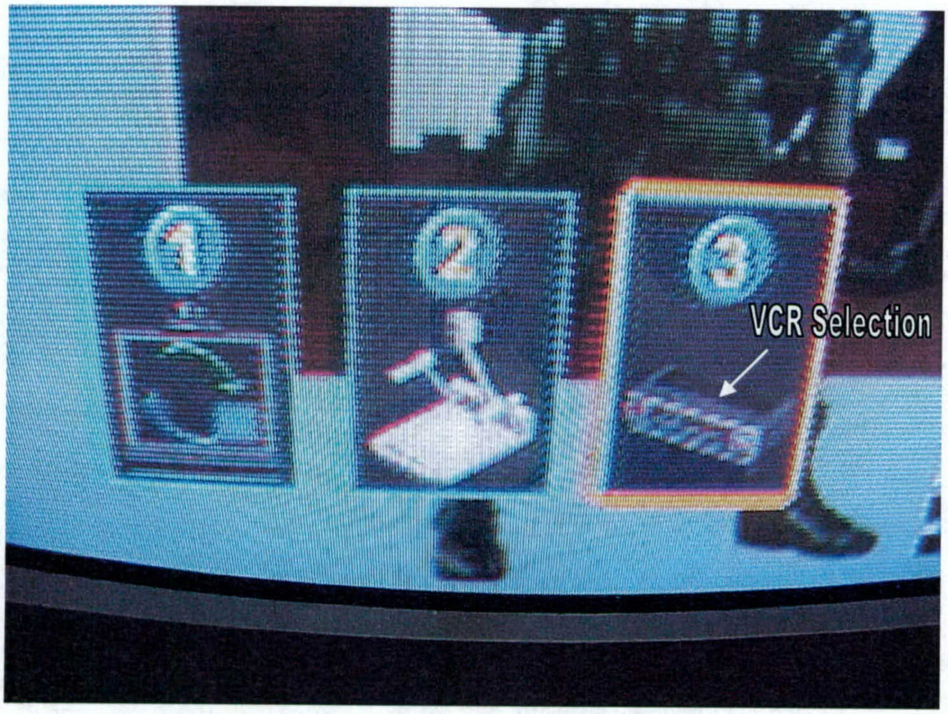

Figure 62. Video source selection screen

6 Preparing the System for Shipment

To help ensure that the equipment survives transporting with no damage, extreme caution should be exercised when packing the system. Basically, performing the setup steps in reverse is a good suggestion. Some other useful tips are listed:

a. Ensure the ViewStation is secured with the collar and the strap installed, as shown in Figure 63. The white buckle should not touch the black camera housing.

b. Remove the KIV and keep in your possession; store the CIK separately. When traveling with the KIV, ensure that you possess proper courier orders and adhere to all applicable regulations for travel both within and outside the continental United States.

c. Ensure the KIV cables are connected in the Main Case.

d. Ensure no loose items are stored in the Main Case, including the power cord.

e. Place cables in the plastic bags. Pack each cable carefully to ensure that the ends are not damaged.

f. Remove the batteries from the ViewStation remote and place in one of the bags.

g. Ensure that all antenna cables, power supply, and M4 documentation are packed in the M4 case.

Figure 63. Securing the ViewStation

7 Scheduling a VTC and Obtaining Technical Support

If you need technical support or would like to schedule a VTC, contact the TEOC at one of the following numbers:

(601) 634-3485 (Commercial)
(312) 446-3485 (DSN)

TEOC personnel respond to the voice mail at these numbers 24 hours a day, 7 days a week for urgent requests for assistance. Every reasonable effort will be made to assist you.

Questions may be emailed to the TEOC at

teoc-vtc@usace.army.mil (nonsecure)

teoc@teleengineering.army.smil.mil (secure)

You can visit our Web sites at:

https://teleengineering.usace.army.mil (nonsecure)

http://teleengineering.army.smil.mil (secure)

Appendix A
Quick Reference VTC Instructions

Nonsecure VTC

1. Set up the M4 terminal. Connect the ISDN CAT-5 cable between the terminal and the main case. Ensure the M4 handset shows "Ready."

Turn on the ADTRAN, then ViewStation. Ensure the microphone is plugged in and the Video USB cable is connected to the laptop.

2. Double-click on the WINTV2000 ICON on the Desktop.

3. Make sure the ADTRAN displays "ISDN-1 Ready."

4. Remove the two 37-Pin D type connectors from the rear of the KIV-7 and connect. Be careful to orient the connectors as not to damage the pins on the male connector.

5. Turn selector knob to VTC.

6. On ADTRAN keypad, Press # to bring up the dialing screen.

7. Once DTE #1 is flashing, press Enter.

8. Press "2," then Enter to bring up the display, which should read Dial Number.

9. Enter the number: for example 001 601 555 5555, then press Enter.

10. The display should read "CLEAR CHANNEL 64000" after the connection is successfully completed. The VTC connection will finalize and you will be ready to communicate.

11. Camera movement can be controlled via the remote.

12. To terminate communications, press the # key to bring up the dialing screen.

13. Make sure DTE #1 is flashing, then press the ENTER key.

14. Press Enter again to hang up the call. Ensure the ADTRAN display reads "Ready."

15. Turn off ViewStation.

16. Shutdown laptop.

17. Shutdown the M4 Terminal.

Secure VTC

1. Ensure the satellite terminal is set up. Connect the ISDN cable between the terminal and the main case. Ensure the microphone is plugged in and the Video USB cable is connected to the laptop.

2. Double-click on the WINTV2000 icon on the desktop.

3. Turn on the ADTRAN and wait until it reads "ISDN-1 Ready."

4. Insert CIK and turn on KIV. The "On-line" light should blink and display should read FDX.

5. Turn Switch Selector to VTC and turn on ViewStation.

6. On the ADTRAN keypad, press "#" to bring up the dialing screen.

7. Once DTE #1 is flashing, press Enter.

8. Press "2," then Enter to bring up the display, which reads Dial Number. Enter the number: for example 001 601 555 5555, then press Enter. After a short delay, the display should read "CLEAR CHANNEL 64000."

9. After the display reads CLEAR CHANNEL 64000, if the screen doesn't go "full screen," press the green button at the top of the remote control. The TD and RD lights should flash on the ADTRAN. If necessary, press the INITIATE button on the KIV to accomplish KIV-lock.

10. To terminate communications, press the # key to bring up the dialing screen.

11. Ensure DTE #1 is flashing, then press Enter.

12. Press Enter again to hang up the call. Ensure the ADTRAN display reads "Ready."

13. Turn off the ViewStation.

14. Turn off KIV and store CIK.

15. Shut down the M4 terminal.

Appendix B
Quick Reference Data Transfer Instructions

1. On the laptop's desktop, double-click on the KlasPeer2Peer icon to start the software.

2. Double-click on the TEOC connection configured on the system.

3. In the "Connect TEOC" window, enter your user name and password.

4. Dial the number to the TEOC TCE-F on the ADTRAN:
   Press #, ensure DTE #1 is flashing (selected), and press Enter.
   Select 2 (Dial Number) and press Enter.
   Enter the TCE-F number and press Enter.

5. When the ADTRAN displays "CLEAR CHANNEL 64000," press the "Dial" button on the "Connect TEOC" window. The system will verify your user name and password.

6. If the connection is successful, an info screen will appear, informing you of the IP addresses for your machine and the far machine. Click "OK."

7. On the next screen, double-click on the File Transfer icon.

8. Select SERVER from the WS_FTP Sites window.

9. A WS_FTP window will appear, showing a folder and its contents for your laptop (Local System) and for the far site (Remote Site). Freely change folders as desired and move files between the two machines by highlighting the file(s) of choice and using arrow buttons in the center of the screen to define the "direction" of the transfer.

10. When finished, exit all software, and hang up the ADTRAN by pressing #, Enter, Enter.

Appendix C
Troubleshooting Tips

Symptom	Fix/Cause/Action
Satellite Phone displays "Busy"	Press the "Exit" button on the handset.
Satellite Phone displays "LES Unspecified Clear"	Remote Station (site you are dialing) isn't ready to accept a call. Contact the remote station via voice phone for troubleshooting.
Satellite Phone displays "MES Clear"	Turn off phone; remove battery and disconnect the A/C power source. Wait 15 sec and reinstall battery, connect A/C power, and turn on.
Satellite Phone displays "MES not authorized"	Go into MENU settings (2nd + 1) on the sat phone and set the LES (landing earth station) to both default and preferred (for the satellite they are using) to France (option 11).
Satellite Phone displays "MES not authorized message"	Check to ensure LES (default and preferred) is set to France for the satellite in use.
Satellite Phone displays "Searching…"	May need software fix; contact TEOC.
Satellite Phone displays "MES timeout"	Readjust antenna and keep trying; decreasing the signal strength slightly may help.
Satellite Phone displays "LES timeout"	Number being called may be busy (ex: calling into 001-555-555-5555, but that number is in use/connected to another VTC user).
ADTRAN displays "Link Down"	1. Turn ADTRAN "off," then, "on." 2. ISDN Cable between gray case and satellite phone is not connected or is faulty. Ensure the cable is connected firmly on the gray case and the satellite phone unit. 3. Satellite phone isn't "ready." If the satellite phone indicates a good signal (57 db or better), press the "OK" button.
ADTRANS' display is blank.	Possible causes: 1. ADTRAN is "off." Turn on ADTRAN power switch on gray case panel. 2. Gray case is turned off. Turn on power to gray case.
KIV displays "Need key"	KIV has no key (fill material) installed and/or the KIV has been zeroized. Coordinate with TEOC and/or COMSEC custodian to reload key.
KIV displays "Zeroized"	KIV has no key (fill material) installed and/or the KIV has been zeroized. Coordinate with TEOC and/or COMSEC custodian to reload key.
KIV says "Invalid CIK"	Possible causes: 1. CIK is damaged and/or demagnetized. Try to reload key (fill material). 2. You have inserted wrong CIK. Ensure you have correct CIK.
KIV shows ERROR msg (ERROR 98, ERROR 99, etc.)	Turn off CIK and turn on again. If this does not resolve the problem, contact the TEOC.

KIV's display is blank.	1. Ensure power and cables are connected to KIV. 2. Ensure power to gray case is on. 3. Turn on CIK.
KIV shows FDX, but not FDX TR	Try one: 1. Press green button on ViewStation remote 3 times. 2. Take off-line/on-line (press On-Line button twice). 3. Press the Initiate button on the KIV. 4. Reboot ViewStation by turning off/on ViewStation power switch. 5. Ensure the three KIV cables are connected firmly. 6. Ensure no cable pins are bent or depressed (damaged) on the KIV data cables (two large cables). 7. Is VTC/Data knob turned to "VTC"? 8. Ensure cables on back of ViewStation are firmly connected. 9. Ensure you dialed on port DTE #1.
ViewStation doesn't boot up when gray case powers-up	1. Ensure power switch on back of ViewStation is on. 2. Ensure cables on back of ViewStation are firmly connected.
Laptop Display is blank	1. Ensure laptop is "ON." 2. Ensure laptop hasn't "gone-to-sleep." Press power switch on laptop to "wake up" laptop.
WinTV2000 doesn't display picture	Check to see if USB Video cable is connected.
Microphone doesn't work	1. Ensure both ends of cable are connected. 2. Mute/unmute microphone.
Receiving no audio	1. Check to see if audio volume on case is "ON" and volume on remote is turned up. 2. Check to see if cables on back of ViewStation are connected.
ADTRAN displays "CLEAR CHANNEL 64000," KIV's synchronize displaying "FDX TR," but VTC doesn't establish	1. Reboot ViewStation. 2. Ensure your key (fill material) is correct. Contact the TEOC.
VTC successfully connects (video and audio transmission are established), but then breaks connection	1. Ensure that satellite dish's line-of-sight is unobstructed (no one walking in front of dish). 2. Ensure signal strength is strong and consistent (56 db or better). 3. Ensure the satellite dish isn't affected by wind.
ADTRAN displays "CLEAR CHANNEL 64000," KIV's synchronize displaying "FDX TR," but VTC doesn't establish	1. On start screen, does ViewStation V.35 appear? 2. Press the Initiate button on the KIV. 3. Press the ON-LINE button on the KIV twice, taking the KIV off-line and then on-line.
Laptop won't boot	Ensure hard drive is properly inserted.
Video "Locks-up" or goes permanently black	Use WinTV2000, instead of WinTV32.

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The TeleEngineering Communications Equipment – Fixed Site (TCE-F), Version II, is described in ERDC SR-04-3.

14. ABSTRACT

In FY97, the U.S. Army Engineer Research and Development Center (ERDC) initiated a technology demonstration program to determine the feasibility of providing deployed troops with direct access to subject matter experts (SMEs). Direct access to SMEs allows responses to engineering challenges beyond the in-theater capability to be provided without the time delays and costs associated with deploying the SME to the theater. Shortly after being established, the TeleEngineering Operations Center (TEOC) initiated an effort to develop a secure, deployable communications package capable of video teleconferencing and data transfer. Described in this report are the components comprising the third generation of this package and steps necessary to set up and operate the system.

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